GEOLOGICA HUNGARICA

FASCICULI AD ILLUSTRANDAM
NOTIONEM GEOLOGICAM ET PALAEONTOLOGICAM
REGNI HUNGARIAE

SERIES PALAEONTOLOGICA

FASCICULUS 6.
1—24 PAGINAE, I—IV TABULAE.

ÉHIK, J.:
Prodinotherium hungaricum n. g., sp.,
with an appendix by SZALAY, T.: On the geological occurrence of *Prodinotherium hungaricum* ÉHIK.

EDIDIT
INSTITUTUM REGNI HUNGARIAE GEOLOGICUM
BUDAPESTINI 1930

Geol. Hungarica ser. palaeont.	6	1—24	Budapestini, 25. I. 1930.

Manuscriptum conclusum Decembris 1929.

I.

PRODINOTHERIUM HUNGARICUM

nov. gen., nov. spec.

by

D^R. J. ÉHIK.

In a coalmeasure at Kotyháza (Dep. Nógrád) owned by the Salgótarján Coal Mining Ltd., some most interesting remainders of a *Dinotherium* skeleton were found, embedded in a blue clay, belonging to the Aquitanian period.[1]

This find has evolved as a particularly valuable specimen in a double point of view, as besides its absolutely fixed geological age it not only represents one of the earliest Dinotherians hitherto known, but consists also of an excellently preserved jawbone and a nearly complete limb.

It may be furthermore noticed that these skeleton-remainders are, as for their systematical valuation, supplemented and even determined by some fragmentary teeth found not very far off in a similar layer at Királd (Dep. Borsod).

THE MATERIAL OF RESEARCH.

The find of Kotyháza: Besides two fragments of a tusk it consists chiefly in an almost intact lower mandible with the firmly rooted pm_4, m_1, m_2, and m_3, on its left, furthermore with the pm_4, m_2, and m_3, on its right branch. Also fragments of a left anterior limb were found as belonging together viz. the scapula, the proximal, median and distal parts of the humerus and the proximal end of the ulna, proximal and distal portions of the radius, the scaphoideum (?), lunatum, triquetrum, trapezoideum, magnum and unciforme. Moreover the first or eventually the second metacarpal bone,[2] a fragment of mc_3, a nearly intact mc_4 and a scrap of the mc_5 complete with two crushed vertebrae the whole set.

The find of Királd: Its most valuable pieces are an undamaged pm_3 inf. dext., than a m^3 inf. sin., a scrap of an undeterminable lower molar and finally some tusk-fragments.

DESCRIPTION OF THE SINGLE PIECES.

The mandible. (Plate I—II.)

Its left branch of 58 cm, the right of 61 cm length. On each side both the corpus and the ramus mandibulae are extant somewhat fragmentarily. The incisival parts are grown together without any trace of a symphysis.

The pars incisiva has a length of 24 cm and forms a considerable portion of the whole lower mandible. Its breadth attains 20 to 22 cm in the region of the pm_3, and about 16 cm in its frontal part. This whole bony mass is bent foreward and downward. The angulus mentalis is rounded off on the inside. The lingual surface is deeply concave and channellikely grooved, in which channel a long,

1 Together with fragments of a tortoise-shell.

2 Too fragmentary in order to be exactly determinated.

cylindrical and pointed tongue may have been moving. The buccal portion is strongly convex, corresponding to the large imbedded tusk-roots. Both the lingual and the buccal portions meet in a crest-like ridge, which forms the upper edge of the mentioned tongue-channel and goes over backwards into the limbus alveolaris.

The pars molaris of the corpus mandibulae seems in side-view the slenderest in the region of the m_3, and by thickening gradually forewards becomes the thickest in the region of the pm_3. The lower edge of the mandible is parallel with the gnawing surface of the molars up to the m_1, and bends downward from that point, following the bend of the tusk. Two foramina mentalia are to be seen on its external surface, the anterior of which, i. e. the larger one, opens below the anterior edge of the pm_3, nearly in the middle of the mandible. The posterior smaller foramen lies between the pm_3 and pm_4. This foramen is plainly visible on both mandibles, whilst the region of the anterior foramen is but fragmentarily preserved on the right mandible.

In vertical view the mandibles are narrowing forwards and seem the most slender in the region of the pm_4. The thickness and breadth are nearly equal in the hinder part of this bones, while in their frontpart the thickness is about the double of the breadth. The following table shows exact measures of the quoted proportions:

	Thickness of the right and left mandible branches in millimeters		Breadth	
	r.	l.	r.	l.
At hinder edge of m_3	100	98	112	114
„ „ „ „ m_2	106	100	103	107
„ „ „ „ m_1	113	117	94	90
„ „ „ „ pm_4	123	134	83	81
„ „ „ „ pm_3	144	147	70	70

These different dimensions are probably due to a deformation of the massy bone and to the circumstance, that owing to this very deformation it is exceedingly difficult to measure exactly corresponding parts of both branches.

On the level of the last third of m_3, almost vertically from the corpus mandibulae, rises the ramus mandibulae, of which only the part corresponding to the feebly developed coronoid process is extant. Its hight is 15 cm, the thickness 2·3 cm. The external surface of the coronoid process is smooth, whilst on its internal surface the fossa pterygoidea are sharply delimited. At the base of this coronoid process a well developed groove is to be seen, to the parietal portion of which the temporal muscle was attached.

As far as it can be judged from the deformed mandible, its right and left branches may have been approximately parallel to each other, or at best but slightly diverging backwards.

The tusk.

Two tusk-fragments were found at Kotyháza. One of them, about 25 cm long, is a fragment of the distal portion of a tusk, with missing about 10—12 cm up to its point, and 25—30 cm down to its root. Thus the length of the whole tusk protruding from the mandible can be estimated to 60—70 cm. The distal part of the fragment shows in section (Fig. 1/*d*) a nearly circular shape with 60 mm in

diameter, the section of its proximal part (Fig. 1/*c*) having rather an oval shape with a longer axis of 94 mm. The enamel-layer is smooth all over, but seems slightly rifled longitudinally towards the proximal part of the fragment and shows moreover a feeble groove on its side.

The other tusk-fragment is 22 cm long, and its anterior section is elliptical (Fig. 1/*a*) with a longer axis of 85 mm, whilst its hinder section (Fig 1/*b*) has an oval shape with a longer axis of 90 mm. The enamel-layer is also rifled in a longitudinal sense and shows on one side the slight groove getting more marked towards the proximal end of the piece.

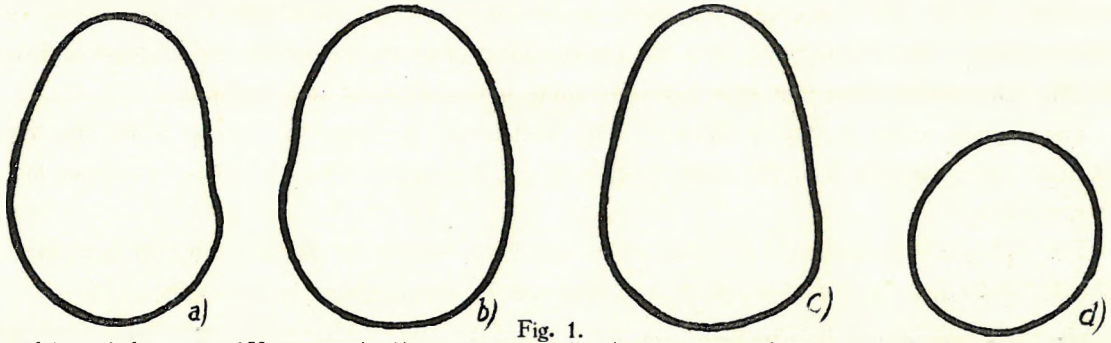


Fig. 1.
Sections of the tusk-fragments of Kotyháza. *a)—b)* posterior piece, *c)—d)* anterior piece (from the root towards the point of the tusk).

I have to add, that the fragments probably belong to the same tusk, which supposition may be confirmed by the fact, that the groove of the second fragment seems to be continued on the hinder part of the first one. This supposition is supported furthermore by my above computation, when I estimated the missing hinder part as much as 25 to 30 centimeters, and the 22 cm length of the second fragment agrees strikingly with my figures. In spite of this, I did not attach the fragments to each other, for their fraction-surfaces do not fit together, and because their corresponding endings are not of equal dimensions, although this latter fact may be the consequence of the variability in the cross sections of the tusk. In the present case f. i. the tusks root embedded in the pars incisiva of the mandible could have only a diameter of 76 mm. This may prove also, that the tusks are not the thickest at their root.

I have besides the above described specimens two small and badly preserved tusk fragments at hand from Királd. The length of the larger one is 12·4 cm, the section of its anterior part being a regular ellipse with a longer diameter of 48 mm and a smaller diameter of 36 mm; its enamel-layer, of which but a very small portion can be observed, seems to be smooth.

The smaller fragment is only 4 cm long and its both terminal sections are equally regular ellipses with diameters of 42 and 34 mm. As compared with the tusk of Kotyháza, these specimens seem to derive from much weaker tusks, although such differences may be due to differences in age or sex, not to take into account the possibility, that the smaller fragments may have been broken from the narrowing distal part of a tusk, so that this circumstance does not justify to make systematic conclusions.

The molars. (Plate I.)

The pm_3 inf., i. e. the first lower premolar is missing on both branches of the mandible found at Kotyháza.

The specimen of pm_3 found at Királd (pl. I, Fig. 4, 5 and 7) is one of the right side; its length is

39·2 mm, its maximal width 31·6 mm. The highest anterior buccal cusp i. e. the protoconid coalesces almost completely with the anterior lingual cusp, the metaconid, but their sharp points may be considered as still separated. From the anterior basis of the protoconid a highly vanishing cingulum ascends the edge of the same and goes over into a small tubercle; this fine tubercle can be considered as a remnant of the paraconid. The posterior side of the protoconid verges in a steep slope toward the hypoconid and goes over with a sharp curve into the slightly worn hypoconid. The well developed entoconid occupies the hinder area, on the posterior side of which rises a small accessory tubercle, the hypoconulid. Behind the entoconid and the hypoconulid, a strongly developed cingulum is to be seen, its outward-going edge passing over into the hypoconid, so that the entoconid and hypoconulid represent within the arc resulting from that edge tubercles quite independent of the cingulum.

The highest cusp is the protoconid. The metaconid is lower by 5 mm, while the hypoconid by 10 mm; the entoconid is on the same level with the hypoconid. The tooth has two roots, the crown is 40 mm high.

The following descriptions of teeth relate to those sitting in the mandible of Kotyháza (pl. I, fig. 2—3). References to the above find at Királd will be stated always expressedly.

On both branches of the mandible the **pm₄** is extant. This tooth is on the right branch heavier worn than that on the left, so that the height of crown of the left pm₄ reaches 27·4 mm, whereas that of the right tooth only 21·5 mm. The wearing is more marked on the buccal part of the tooth than on the lingual. Each of these teeth had originally two transversal crests. No trace either of a talonid part. or of a cingulum can be recognised on the lingual part of them.

Length of the left pm₄	49·8 mm
Breadth „ „ „ „ . . .	±43·3 „
Length „ „ right „	44·6 „
Breadth „ „ „ „	44·1 „

The **m₁** is extant only on the left branch of the mandible. Its much worn lingual edge is slightly broken. The tooth was characterised before having been worn by three transversal crests and by a weakly developed cingulum at its back, the place of the transversal crests being still well visible. The length of the tooth is 58·7 mm, its breadth ±46 mm.

The right **m₂** is quite intact, while in the case of the left one, its posterior lingual cusp is missing. The tooth is characterised by two transversal crests diverging almost unnoticeably toward the lingual side and by a well developed cingulum on its posterior side. Besides that, on the anterior buccal side of both the right and left tooth, the remnant of a frontal cingulum is visible. The transversal crests slope upward toward the lingual side, and their lingual angle is drawn out into an elevated cusp. The buccal angles of the transversal crests are of the same height, while among the lingual angles the anterior one is higher. Between the transversal crests a depression is to be seen, cut in two by a pass, the internal sloping of which being larger and wider, whilst the external sloping is smaller and narrower. The back part of the tooth is dominated in almost its full breadth by a cingulum similar to a transversal crest, the highest point of which coincides with the summit of the pass separating the transversal depression; the slopes of the cingulum are falling down from that highest point both inward and outward. That is,

while the edges of the real transversal crests are concave, that of the posterior cingulum, which appears like a transversal crest, is convex. The measurements of the teeth are:

Length of the left m_2	62·3 mm
Breadth „ „ „ „	55·1 „
Length „ „ right „	62·2 „
Breadth „ „ „ „	54·6 „

The m_3 is entirely intact on the right branch, while the lingual anterior cusp of the left m_3 is missing. The two transversal crests are like those on m_2, but less worn. The remnant cingulum observed on m_2 is even less visible, although its presence may be established. The posterior cingulum is very powerfully developed, its highest point being drawn into a cusp, so that its shorter edge slopes steeply over the buccal part of the tooth, while its longer edge smoothly slopes toward the lingual side of the tooth. The edges of the cingulum are pearled, most markedly on the interior edge. Due to the steepness of the cingulum, this latter and the posterior transversal crest are separated by a deep depression. It is highly interesting, that under the posterior internal side of the cingulum, a pearled enamel edge forms in a length of one centimeter a second cingulum, deeply enough.

Length of the left m_3	72·5 mm
Breadth „ „ „ „	55·5 „
Length „ „ right „	73·2 „
Breadth „ „ „ „	55·5 „

Besides I have the fragment of a right lower m_2 at hand, found at Királd. Only its buccal part is extant. Remarkable on this slightly worn tooth is, that the posterior cingulum was originally pearled also in this case, and was sufficiently high too, whilst the cingulum, in the case of the above described specimen of m_2 from Kotyháza, got low by wearing off. A small enamel pass, which is parallel to the longitudinal axis of the tooth is set transversally on the buccal part of the depression. This enamel pass is worn on the corresponding tooth of Kotyháza, but it can be still observed on both m_3, though in a much reduced shape. The length of the tooth is $\pm 60{\cdot}7$ mm; its breadth can not be measured. Else it is like with the corresponding teeth sticking in the mandible of Kotyháza.

A most striking propriety of the m_2 and m_3 found at Királd so as at Kotyháza is, that the enamel-layer of the teeth is finely wrinkled from its neck down to the root of the transversal crests all around. These wrinkles are as fine as those on the human fingertips, and run parallel with the lower edge of the crown-enamel (pl. I, fig. 6). I have to notice that such fine enamel sculptur is visible also on a premolar fromKiráld, while it has probably got destroyed on the pm_4 and m_1 from Kotyháza.

The vertebral column. (Plate III.)

The first thoracic vertebra (vertebra thoracalis prima) has been found in a sufficiently good state. The body of this vertebra is 60 mm high and 88 mm broad in front, whilst 73 mm high and 90 mm broad behind. The neural canal is considerably wider than high, being 60 mm wide, 18 mm high in front, and 70 mm wide, 18 mm high behind. Only the right anterior zygapophysis is extant, which is parallel with the longitudinal axis of the vertebral column. The right transversal process is extant

too. The spinous process as well as the posterior zygapophyses are broken off. The openings of the foramina intervertebralia, where nerves get out of the spinal marrow, are plainly visible, especially on the right side of the vertebra. In the same region the costal fovea is still extant, as well as the cranial and the caudal fovea. The transversal costal fovea is quite invisible.

There exists furthermore the fragment of a caudal vertebra, on which the neural canal is failing and only a fragment of the right transversal process has remained visible. I have to add that all other processes are lacking too on this caudal vertebra.

The bones of a left anterior limb.

The scapula. (Plate III.)

The glenoid cavity is fairly intact and of oval shape; both its anterior and posterior diameter attain about 175 mm, the transversal one (in its anterior third) 95 mm. The coracoid is well developed, roundly swollen.

The anterior edge of the scapula is broken off, but estimated from the thickness of the missing bones, the prescapula may have been slightly developed; this supposition is confirmed also by a strongly enough concave portion of the prescapular fossa. Such conclusion is backed also by an extraordinary strength of the broken spine base, as the part below the acromion shows a diameter of 28 mm. The postscapular fossa is as large as with the Indian elephant. Remarkable rugged lines are running on its surface in distances of 8 to 10 mm, almost parallel with the longitudinal axis of the scapula. Such unevenness increased the attachment of the well-developed muscles. The fragment at hand shows three such protruding lines (linea). The internal surface of the scapula may be called relatively smooth, the subscapular fossa being slightly concave. Corresponding to the strong postscapular fossa of the other side, we find on the front side a prominent elevation, the slopes of which ridge lean at an angle of 78^0 to each other. The collum on the anterior part of the scapula is pregnantly developed, due to a strongly swollen coracoid. The length of the whole fragment is 360 mm, its breadth, on the part where the muscle was attached, 178 mm.

The humerus. (Plate III.)

Three fragments of this bone are extant, namely the proximal portion, one piece of the shaft and the end of the distal part.

The proximal fragment consists of the head and neck of the humerus. The glenoid surface of the head is almost entirely intact, its length being about 175 mm, with a transversal diameter of 95 to 100 mm. Among the tuberosities of the upper segment of this limb, only a piece of the external or great tubercle is preserved, which protruded above the head piece. Its anterior part is ridged, the end of that ridge leaning above the bicipital groove in the shape of a protuberance. The internal or small tubercle is represented by a very flat elevation, which is however sufficiently extended. The posterior part of the caput is quite fragmentary. The length of this fragment is about 170 mm.

The fragment of the shaft is strongly deformed, in side-view rather looking flat. Its section is

ellipsoidal, with an excentricity of 1:2. This fragment joined with its wider side to the proximal fragment — some centimeters of its length are missing — and corresponds to the part of the shaft extending toward the deltoid ridge. The length of the fragment is 265 mm.

The distal fragment of the humerus joined to the shaft — 5—6 cm are missing — with a bend of 35°. The degree of the bend can easily be measured on the section of the bone. The bone has the larger — internal — part of the trochlea; besides the internal condyle was probably also well developed; a supracondylar fossa can be found between the said condyle and the trochlea. The very extensive fossa supratrochlearis is on the other side of the bone. The length of the fragment is 260 mm.

The radius. (Plate III.)

Its proximal end is almost entirely intact; a small piece of the glenoid surface is missing on one angle of it. On its side, which is leaning on the glenoid surface of the ulna lateralis, a small circular lateral glenoid surface can be observed. The radius is extremely knurled and porous in that region, forming a surface excellently adapted for the attachment of glenoid ribbons. The shaft of the radius goes gradually widening over into the caput. The length of the whole fragment is 215 mm, while the anterior back diameter of its shaft is 40 mm, that of the caput 64 mm long.

I have a bone fragment at hand which I was unable to determine exactly by lack of comparative material and of literature. I consider the bone to be the distal end of the radius. Its length is about 118 mm, its breadth about 40 mm, with a thickness of 50 mm, above the joint, respectively of 65 mm on the joint. The bone looks compressed in lateral—medial direction. In top-view the posterior side of the glenoid surface is almost flat and slightly concave, its anterior part prismatically protruding, the downward sloping sides of which meet in a transversal edge. The flatter part of the glenoid surface fits exactly the corresponding part of the lunatum, moreover the lateral articulating surfaces of the prismatically protruding part can be connected probably with the scaphoideum, leaning on it.

The ulna. (Plate II.)

There is a proximal fragment of the ulna with the olecranon. The fragment is bounded by three more or less concave surfaces; the articulating area at its end has a fat V-shape, and the lower point of the V corresponds with the area on the olecranon. The anterior side of the ulna is the most concave; the proximal end of the always transversally set radius fits exactly into this cavity. On the upper surface of that cavity smaller articulating areas for the radius are to be seen on each side, the external of which being larger than the internal. Moreover the surface of the named cavity is just as knurled and roughly porous as the external back part of the proximal end of the radius. The external, narrower side of the ulna is much less concave, while the internal, larger one is even less concave. The olecranon has a well developed massive protrusion. The fragment without the olecranon is 260 mm, together with the olecranon 350 mm long. I was able to reconstruct later on the proximal end of the ulna, and the illustration (pl. II, fig. 3) gives a view of the reconstructed ulna. I have to notice that the back part of this olecranon is worked out only in a sketch-like way on the reconstruction.

The scaphoideum (?). (Plate IV.)

The bone is somewhat compressed and fragmentary, parts of it being lost. Especially the articulating areas, so important for the reconstruction, are hurt in a manner, that an absolutely exact determining of the bone was impossible. Considering that the scaphoideum is the only bone missing among the parts of the procarpus, the bone in question may be in all probability the scaphoideum. Its height is about 100 mm, its breadth about 50 mm and its thickness about 70 mm. Its fragmentary articulating area leans smoothly on the side of the lunatum, and the lower intact articulating area on the corresponding part of the trapezoideum, besides some articulating area being left for the thumb. But there is also a strongly worn area on the bone, looking like a third articulating surface, a circumstance which I am unable to explain in lack of comparative expedients, and that is why I put a note of interrogation after the name of the bone.

The lunatum. (Plate IV.)

Though the external anterior part of this bone is missing, its determining I consider as absolutely certain. It is remarkable that the bone is strongly compressed laterally, therefore its hight is much greater than its breadth, the thickness being the most considerable, viz.:

height = 64 mm, breadth about = 50 mm, thickness = 90 mm.

Its proximal articulating area being rather concave, the distal articulating surface is strongly concave at its back, while strongly convex on its front side. On the internal side of both the proximal and distal part ribbonlike articulating surfaces are to be seen, each of them corresponding to articulations of the scaphoideum. A strikingly rough groove lays between the articulating areas, to which the articulating ribbons were attached. Another remarkable feature is given to the bone by being in its anterior part considerably broader than in the posterior, whereas the bone sharply bends in the median region of its external side somewhat in a recesslike way, whilst the portion receding thence towards the back is only half as thick as the anterior. The bone is placed exactly above the magnum.

The triquetrum. (Plate IV.)

Compared with the formerly mentioned, this bone is much broader than high, even lower than the adjoining lunatum. This fact can be explained only by supposing that also the part of the lunatum touching the triquetrum — which part is missing on the specimen at hand — must have been low. That it was really so, seems sufficiently proved also by the obliquely outwards bent surface of the distal articulation of the lunatum, as well as by the corresponding proximal articulating surface of the magnum. Its dimensions are:

height = 45 mm, breadth about = 92 mm, thickness = 60 mm.

The proximal articulating surface of the bone is concave on its external, and convex on its internal part. The distal articulating surface is concave on the whole. A thoroughly developed semilunar articulating surface is to be seen below on the bones side touching the lunatum. In its upper part the proximal articulating surface bends slightly and without a sharp angle on the internal side of the bone; the area serving to the attachment of articulating ribbons appears again between these surfaces in the shape of a deep groove.

The trapezoideum. (Plate IV.)

The internal part of this bone is missing, only the external part, tuching the magnum, being intact. As far as it can be judged from the fragment, it was probably a nearly cubeshaped bone, in front-view hardly over 1 or 2 mm higher than broad. Its

height = 55 mm, breadth about = 52 mm, and thickness = 45 mm.

The proximal articulating surface is concave and fits well to the corresponding portion of the scaphoideum. Its distal articulating surface is convex. The articulating surface on its external (lateral) side fits excellently to that on the median side of the magnum.

The magnum. (Plate IV.)

It is a remarkably high and slender bone which, without mentioning some minor injuries, is practically intact. It looks in front-view like an inverted trapeze, the base of which = 40 mm and the top = 50 mm, these dimensions being of course identical with its width. Dimensions:

height = 60 mm, thickness = 85 mm.

The proximal articulating surface is convex in a lateral median direction, abruptly elevating at the back into a rounded protuberance. This protuberance fits excellently into the corresponding groove of the lunatum. The distal articulating surface is concave, being narrower and shorter than the proximal surface. The upper ribbonlike articulating area of the internal side is almost intact, while only one part of the lower surface has remained intact, the rest being broken off. Considerable grooves are laying between the two articulating ribbons on both sides. Only the upper ribbonlike articulating area is developed on the external part, while the lower one is replaced by a portion of the distal surface, drawn out moreover laterally. The bone joins only the lunatum above, and the third finger below.

The unciform. (Plate IV.)

In front-view this bone is similar to the section of a circle with an obtuse angle, the radius of which measures 60 mm, while the angle between the radii attains 115°. The thickness of the bone is 60 mm above and 75 mm below. Its proximal articulating surface is convex. The distal similar surface is rather concave, and only the articulating area of the last metacarpus is more elevated and almost flat. The bone shows two articulating ribbons on its internal side, one above and one below, berween which a very strong groove marks the place, where the articulating ribbons were attached. The proximal part of the bone joins the triquetrum, its distal part the fourth and fifth metacarpals.

The metacarpals. (Plate IV.)

A fragment of the proximal end of the first (?) or second (?) metacarpal, the proximal end of the third metacarpal, the fourth metacarpal (which can be well repaired) and a fragment of the proximal end of the fifth metacarpal are still extant.

Among these fragments it is only the fourth metacarpal which deserves detailed description, and could be repaired[1] on the whole. Its dimensions are:

[1] Only repaired not reconstructed!

length = 130 mm, breadth = 43 mm on the proximal and 50 mm on the distal end, the thickness being = 60 mm.

The section of the bone is triangular, with the base looking forward. It is remarkable that while the proximal articulating surface stands at right angles on the longitudinal axis of the bone, the distal one bends sharply toward the same axis, and therefore the finger normally leans obliquely and stretched outwards on the soil. In consequence the bespoken metacarpal must have belonged either to the 4-th or the 5-th finger. Moreover there are articulating areas on each (lateral and medial) side of the proximal part, proving that we have to do with an intermediate finger, i. e. the fourth one, according to the premisses.

ON THE ANTERIOR LIMB IN GENERAL.

On the limbs of the *Dinotherium* W. O. DIETRICH has written a very remarkable and interesting memoir that deals especially in detail with the metacarpals. The value of the remainders from Kotyháza is enhanced by the circumstance that the identity of the fourth metacarpal could be exactly established, and that the corresponding unciform is also present in an almost intact state. I have to notice that all the bones found at Kotyháza were detected on one spot and in the same time, laying in an area of about 2 to 3 square meters, so that they may belong without any doubt to a single animal. This is confirmed also by the peculiar fact, that all the bones of extremities proved to be the parts of a single left anterior limb.

The fourth metacarpal of the quoted find is laterally compressed, but far not as much as the corresponding bone of the specimen from Pikermi, characterised by DIETRICH as „brettartige Verdrückung der Knochen." The bone at hand combines somehow the massiveness of the metacarpals of Mastodons, and the gracility of those of Indian elephants. In any case the described bone resembles rather the metacarpal of an Indian elephant, than of a *Mastodon* by considering particularly its prismatic structure.

Moreover its distal articulating surface — and even the proximal one as shown formerly — has a remarkable oblique position toward the longitudinal axle of the bone. This area is cutting on the Pikermi metacarpal bone almost at a right angle the same direction. Whilst the distal articulating surface of that bone is throughout concave on the Pikermi specimen, in the case of the metacarpal from Kotyháza it is convex in a fronto—posterior direction. The frontal part of this surface being but slightly concave in a lateral—median direction, its central part is even, and its posterior part appears sinuously bent. It should be wrong to speak in the case of the Hungarian specimen of a simply concave surface in lateral—median direction, since it combines practically both the concave as the convex characteristics. Therefore the observation of GAUDRY, whereafter the distal articulating surface of the metacarpal is concave with the *Dinotherium* and the same surface is convex with the *Mastodon*, does not seem to be incontestable, or may be true only for *Dinotheria* of a younger geological age.

DIETRICH alleges also that the anterior limb of the quoted species has five toes, with a probably much reduced thumb. In the find of Kotyháza the smallest articulating surface was to be seen on the fifth toe. On the base of the bespoken fragments, I was unable to get to any decision as either for, or against the reduction of the thumb.

[2] L. c., p. 44—56.

A most striking feature arises from the circumstance that among the carpal bones the lunatum and the magnum are laterally compressed, while the triquetrum and the cuneiform are robust and broad. As far as it can be established, only the third toe was joined with the magnum, but I did not find major divergences between the development of the third and the fourth toe. It is peculiar that the distal end of the radius joining the lunatum is surprisingly slender, respectively is laterally compressed too. I have to add that a compressed shape of the magnum — that is a *Palaeomastodon*-like character — has been observed by KAFKA, and is also mentioned by DIETRICH.

According to DIETRICH the anterior limb of the *Dinotherium giganteum* of Pikermi is slender and long, with a decidedly reduced thumb, occupying a stretched position. Therefore if we term the anterior limb of the *Mastodon* „brachypod" and that of the *Elephas* „mesatipod", the anterior limb of the *Dinotherium* can be considered to be „dolichopod." As the fact stands, the anterior limb of the *Dinotherium* of Kotyháza is rather like that of an *Elephas*, that is to say mesatipod, inclined however to become dolichopod.

I tried to get the length of the single bones out of the fragments extant, in order to come to a conclusion as for the size of the whole animal. So I established that the length of the shoulderblade may have been 54 cm, that of the humerus 70 cm, the ulna 60 cm, the root of the foot 12 cm, the middle foot 15 cm and the length of the toes 12 cm each. Accordingly to these measures, the height of the body at the level of its shoulders may have been 200 to 210 cm, so that the living animal would be much smaller than a well-developed Indian elephant.

SYSTEMATICAL NOTES.

The species of *Dinotherium* hitherto described may be divided into two groups, namely the *Dinotheria* of larger and those of smaller size. On this base DEPÉRET treated them as far back as 1887. The species described since may be classified just as well according to their size. As a rule, those of larger size are of a more recent geological period, particularly of the middle and upper Miocene, while those of smaller size derive from the lower and middle Miocene. An exception from this rule represents the *Dinotherium naricum* between the species of large size, though, according to PILGRIM, it has been met in Aquitanian deposits.

The *Dinotheria* of Kotyháza and Király belong equally to those of smaller size, so as for their systematical appreciation they are to be compared with similar species. Such are the *D. bavaricum*, *D. intermedium*, *D. Cuvieri* and *D. Hobleyi*. DEPÉRET considers the *D. bavaricum* and the *D. intermedium* as variations belonging to *D. Cuvieri*. Thus only *D. Cuvieri* and *D. Hobleyi* being left at disposal for comparisons, the dimensions of their teeth (in millimeters) may be collated as follows:

	Dinotherium Cuvieri	*Dinotherium Hobleyi*	*Dinotherium* of Kotyháza and Király
Length of pm_3	43	40	39
„ „ pm_4	48	46—49	44·6—49·8
„ „ m_1	60	56	58·7
„ „ m_2	69	58—62	62·2—62·3
„ „ m_3	72	65—72	72·5—73·2

From these figures the impossibility of determinating exactly a specimen merely on the base of the teeth measurement's is plainly visible.

The structure of the lower pm_3 seems to serve better for distinguishing of the single species. Namely in the case of *D. Cuvieri* and *D. Hobleyi* the hypoconid and the entoconid are connected by a posterior cingulum, while with the specimen of Király the entoconid of pm_3 lays inside of the cingulum and is thus in no connection with it. This peculiar formation of the pm_3 distinguishes the Hungarian specimen from all *Dinotheria* hitherto described, so as from the larger species too.

Besides the posterior mental foramen falls below the middle of the pm_4 with *D. Cuvieri* and *D. Hobleyi,* while in the case of the Hungarian animal it is to be found in the vertical separating the pm_3 from the pm_4. The place of the anterior mental foramen is unknown with *D. Hobleyi;* in the case of *D. Cuvieri* it falls below the middle of pm_3; in the Hungarian specimen it is situated below the anterior edge of the pm_3. In consideration of all these circumstances I give a new name viz: *D. hungaricum* to the specimen found at Kotyháza and Király.

I also have to refer in connection with my establishments on what was said about the structure of the anterior limb. Since DIETRICH's treatise, mentioned above, we excellently know the structure of the foot of *D. giganteum.* I had the luck to describe the anterior limb of a small-sized *Dinotherium.* In the final conclusions the anterior limb of the *D. giganteum* was found dolichopod, while that of the *D. hungaricum* is mesatipod. From the systematic point of view the mesatipody is a much more primitive character, than the systematically highly progressed dolichopody. This very interesting and important difference in the structure of the foot induces me to class the *D. hungaricum* into a new genus, under the genetic name of *Prodinotherium.* It is possible that further finds will allow to place all the small-sized *Dinotheria* into this new genus, but in lack of knowledge about the respective foot-bones I had to drop this classification. The *Prodinotherium hungaricum* must be by all means one of the eldest *Dinotheria* hitherto known from an exactly determined geological age.

LITERATURE CITED.

ANDREWS, C. W.: On a new species of *Dinotherium* (*Dinotherium hobleyi*) from British East Africa. Proc. Zool. Soc. London, 1911, p. 943—945.

ANDREWS, C. W.: On the Lower Miocene Vertebrates from British East Africa, collected by Dr. FELIX OSWALD. Quart. Journ. Geol. Soc. London, vol. 70, 1914, p. 163—186.

COOPER, C. FORSTER: Miocene *Proboscidia* from Baluchistan. Proc. Zool. Soc. London, 1922, part III, p. 609—626.

DEPÉRET, CH.: Recherches sur la succession des faunes de Vertébrés Miocènes de la vallée du Rhône. Archives d. Mus. d'Hist. Nat. d. Lyon, Tome IV., 1887. p. 45—313.

DEPÉRET, CH.: La fauna de mammifères Miocènes de la Grive-Saint-Alban (Isère) et de quelques autres localités du Bassin du Rhône. Archives d. Mus. d'Hist. Nat. d. Lyon, Tom. V, 1892.

DIETRICH, O.: Über die Hand und den Fuss von *Dinotherium*. Zeitschrift d. Deutsch. Geol. Ges., Monatsberichte, Bd. 68, 1916, p. 44—53.

FELIX, J.: Vergleichende Bemerkungen zu den Mammutskeletten von Steinheim a. d. Murr (in Stuttgart) und von Borna (in Leipzig). Sitzungsberichte d. Naturf. Ges. zu Leipzig, Jhrg. 39, 1912.

HILBER, V.: Steirische Dinotherien. Mitteilungen d. Naturwiss. Ver. f. Steiermark, Bd. 51, 1914, p. 111—132.

MEYER, H. v.: Das *Dinotherium Bavaricum*, mit Rücksicht auf die riesenmässigste fossile Thiergattung der Dinotherien überhaupt, und auf die Struktur der Mahlzähne in den Tapiren. Nova Acta Phys.-Med. Acad. Caes. Leopold. Car. Nat. Curios., vol. 16, pars 2, 1883, p. 487—516.

PALMER, R. W.: An incomplete skull of *Dinotherium* with notes on the Indian forms. Memoirs of the Geol. Surv. of India, new series, vol. VII, 1924, Memoir No. 4.

PILGRIM, GUY E.: The Tertiary and Post-Tertiary freshwater deposits of Baluchistan and Sing with notices of new vertebrates. Records of the Geol. Surv. of India, vol. XXXVII, 1908—1909, p. 139—166.

PILGRIM GUY E.: The Vertebrate fauna of the Gaj series in the Bugti hills and the Punjab. Memoirs of the Geol. Surv. of India, new series, vol. IV, 1912, Memoir No. 2.

SCHLESINGER, G.: Studien über die Stammesgeschichte der Proboscidier. Jahrbuch d. k. k. Geol. Reichsanst., Wien, Bd. 62, 1912, p, 87—181.

STEFANESCU, G.: *Dinotherium gigantissimum*. Anuarul Mus. Geol. Pal., Bucuresti, 1894, p. 126—199.

STEFANESCU, G.: *Dinotherium gigantissimum* STEF. La squelette de Mânzati. Anuarul Mus. Geol. Pal., Bucuresti, 1896, p. 110—145.

Prodinotherium hungaricum n. g., n. sp.

(KIVONAT.)

A kotyházai *Dinotherium* lelet nemcsak azért értékes, mert kora pontosan ismert, hanem azért is, mert a majdnem teljesen ép alsó állkapoccsal együtt egy baloldali mellső végtag közel teljes csontmaradványai is napvilágra kerültek. A rendszertani értékelés szempontjából rendkívül becsesen egészíti ki a kotyházai *Dinotherium*-leletet az a néhány fogtöredék, amely a borsodmegyei Királdról került felszínre. A két lelet teljesen azonos rétegtani fekvését tekintve, azok rendszertani összetartozása kétségtelen.

Kotyházáról való egy alsó állkapocs majdnem teljes töredéke, a baloldalon a pm_4, az m_1, az m_2 és az m_3-mal; a jobboldalon a pm_4, m_2 és m_3-mal; ide tartozik két darab agyartöredék is. Ezenkívül egy baloldali mellső láb csontjainak töredékei, nevezetesen a lapockacsont (scapula), a felkarcsont (humerus) proximális, középső és disztális része, a singcsont (ulna) proximális vége, az orsócsont (radius) proximális és disztális vége, a kéztőcsontok közül a scaphoideum?, lunatum, triquetrum, trapezoideum, magnum és unciforme, a kézközépcsontok (metacarpus) közül az első vagy második, az mc_3 töredéke, a majdnem ép mc_4 és az mc_5 töredéke. Előkerült ezeken kívül még két csigolya töredéke is.

A királdi leletből a legnevezetesebb darab a teljesen ép pm_3 inf. dext. Ezenkívül előkerült az m_3 inf. sin. és egy meg nem határozható alsó zápfog töredéke, valamint két agyar darab.

Az egyes darabok részletes leírását az angol szövegben közlöm, ezen a helyen csak összefoglalólag beszélhetek a maradványokról. Igy beszélnem kell mindenekelőtt a mellső lábról általában.

A *Dinotherium* végtagjairól W. O. Dietrich-nek jelent meg igen érdekes és szép munkája.[1] Dietrich különösen a kézközépcsontokat tárgyalja részletesen. A kotyházai maradványok értékét fokozza az, hogy az egyik meglévő és majdnem teljesen ép kézközépcsont negyedik volta pontosan megállapítható, másrészt az, hogy a fölötte levő kéztőcsont (unciforme) is majdnem ép állapotban maradt meg. Megjegyzem, hogy az összes kotyházai csontmaradványok egy helyről és egy időben kerültek ki, mintegy 2—3 m^2-nyi területről, úgyhogy a csontok összetartozása majdnem kétségen felüli. Megerősíti ezt a feltevést az a sajátságos körülmény is, hogy az összes csontok egy baloldali első láb maradványainak bizonyultak.

A kotyházai *Dinotherium* kézközépcsontja is többé-kevésbbé laterálisan összenyomott, de korántsem annyira, mint azok a pikermii maradványok, amelyeket Dietrich ismertetett és amelyeket Dietrich kifejezésével „brettartige Verdrückung der Knochen" jellemezne. Az előttem levő csont sajátságosan egyesíti magában a *Mastodon* kézközépcsontjának vaskosságát és az indiai elefánt kézközépcsontjának könnyedségét. Mindenesetre inkább hasonlít ez a csont — már prizmatikus felépítésénél fogva is — az utóbbihoz, mint az előbbihez.

---

[1] W. O. Dietrich: Über die Hand und den Fuss von *Dinotherium*. Zeitschr. d. Deutsch. Geol. Ges., Monatsberichte 1916, pag. 44—56.

A disztális izületi felület — sőt részben a proximális izületi felület is — feltűnően ferdén áll a csont hossztengelyéhez viszonyítva. A pikermii kézközépcsonton az izületi felületek majdnem derékszögben metszik a hossztengelyt. A disztális izületi felület a pikermii állaton konkáv, a kotyházai kézközépcsonton mellső—hátsó irányban konvex; laterális—mediális irányban az izületi felület mellső része gyengén konkáv, középső része egyenes, hátsó része hullámosan (egy rendkívül elnyújtott fekvő hullám alakjában) görbült. Tehát laterális—mediális irányban sem beszélhetünk ez esetben abszolut konkáv felületről, mert az tulajdonképen mindkét jelleget magában foglalja. GAUDRY-nak az a megfigyelése tehát, hogy a kézközépcsont disztális izületi felülete a *Dinotherium*-on konkáv, a *Mastodon*-on konvex, úgy látszik, nem minden esetben helytálló, vagy csak a fiatalabb korú *Dinotherium*-okra vonatkoztatható.

DIETRICH megjegyzi, hogy az állat mellső lábán, bár öt ujjú volt, a hüvelyk valószínüleg redukált lehetett. A kotyházai leleten legkevesebb izületi felületet az ötödik ujj számára találtam. A hüvelyk redukciójára a meglevő maradványokból nem tudtam se pro, se kontra következtetéseket vonni.

Rendkívül feltűnő, hogy a kéz csontjai közül a lunatum és a magnum laterálisan összenyomott, míg ezzel szemben a triquetrum és az unciforme robusztus és széles. Megjegyzem, hogy a magnum összenyomottságát — *Palaeomastodon*-szerűségét — már KAFKA is észlelte és DIETRICH is felemlíti. A magnummal csak a harmadik ujj ízült voltát állapíthattam meg. A 3. és 4. ujj proximális ízeinek fejlettsége között nagyobb különbséget nem észleltem.

Sajátságos, hogy a lunatummal ízesülő orsócsont disztális vége is feltűnően keskeny, helyesebben laterálisan összenyomott.

DIETRICH szerint a pikermii *Dinotherium giganteum* mellső lába keskeny és hosszú, erősen redukált hüvelyk ujjal, meredek ujjtartással. Vagyis, ha a *Mastodon* mellső lábát b r a c h i p o d n a k, az elefántét m e z a t i p o d n a k nevezzük, akkor a *Dinotherium* mellső lába d o l i c h o p o d. Ezzel szemben a kotyházai *Dinotherium* mellső lába inkább elefántszerű, vagyis mezatipod, amelyben azonban már benne van a dolichopodiára való hajlam.

A meglevő csonttöredékekből számítás utján igyekeztem megállapítani az egyes csontok hosszát, hogy ebből az állat nagyságára vonhassak következtetést. Igy a lapocka maximális nagyságát 54 cm hosszúnak határoztam, a felső kart 70 cm, az alsó kart 60 cm, a lábtőt 12 cm, a kézközépcsontot 15 cm, az ujjak hosszát pedig 12 cm-nek számítottam. Ebből a vállmagasság 200—210 cm-nek adódik ki, vagyis az állat jóval kisebb volt egy kifejlett indiai elefántnál.

Rendszertani szempontból az eddig leirt fajokat két nagy csoportba sorolhatjuk, nevezetesen a kis és nagy termetű *Dinotherium*-ok csoportjába. Ezen az alapon tárgyalta azokat már 1887-ben DEPÉRET is. Az 1887 óta leírt új fajok is nagyság szerint ugyanilyen jól csoportosíthatók. Általában véve a nagy fajok mind fiatalabb korúak, a közép és felső miocénből valók, míg a kis alakok, az idősebbek, az alsó és a közép miocénből származnak. Kivétel ez alól a nagy fajtákhoz tartozó *D. naricum*, mely PILGRIM szerint aquitán kori.

A kotyházai és királdi *Dinotherium* a kis termetűekhez tartozik s így a rendszertani értékelés szempontjából csak a kis fajtákkal hasonlítható össze. Ezek a *Dinotherium bavaricum*, a *D. intermedium*, a *D. Cuvieri* és a *D. Hobley*. DEPÉRET a *D. bavaricum*-ot és a *D. intermedium*-ot a *D. Cuvieri* rasszainak mondja; marad tehát összehasonlításra a *D. Cuvieri* és a *D. Hobleyi*. Lássuk a fogak méreteit (milliméterekben):

	D. Cuvieri	*D. Hobleyi*	*P. hungaricum*
A pm_3 hossza	43	40	39
A pm^4 „	48	46—49	44·6—49·8
Az m_1 „	60	56	58·7
Az m_2 „	59	58—62	62·2—62·3
Az m_3 „	72	65—72	72·5—73·2

A fenti táblázatból világosan látjuk, hogy csak a fogak nagysága alapján a faji hovátartozás kérdését nem dönthetjük el.

Igen jó alap az egyes fajok megkülönböztetésére az alsó pm_3 szerkezete. Nevezetesen a *D. Cuvieri* és a *D. Hobleyi* fogán a hypoconid-ot és entoconid-ot hátsó zománcöv (cingulum) köti össze, míg a királdi pm_3-on az entoconid a cingulumon belül van, tehát semmiféle összeköttetésben sincs a cingulummal. A pm_3-nak sajátságos szerkezete miatt ez a magyar állat az összes eddig leírt *Dinotherium*-októl — tehát a nagy fajtáktól is — különbözik. Ezenkívül míg a hátsó ideglyuk (foramen mentale) a *D. Cuvieri*-n és a *D. Hobleyi*-n a pm_1 közepe alá esik, addig ez a magyar állaton a pm_3 és pm_4-et elválasztó vertikálisban található. Az elülső ideglyuk helye a *D. Hobleyi*-n ismeretlen; a *D. Cuvieri*-n ugyanaz a pm_3 közepe alá esik; a magyar állaton a pm_3 elülső széle alatt van. Mindezeket megfontolva a kotyházai és királdi maradványokat új fajnévvel — *D. hungaricum* — jelölöm.

És itt kénytelen vagyok hivatkozni a mellső láb szerkezetéről elmondottakra is. Dietrich már idézett tanulmánya alapján a *D. giganteum* lábszerkezetét nagyszerűen ismerjük. A véletlen folytán nekem jutott a szerencse, hogy egy kis testalkatú *Dinotherium* mellső lábát ismertethessem. Végeredményben tehát míg a *D. giganteum* mellső lába dolichopod, addig a *D. hungaricum*-é mezatipod. A mezatipodia pedig fejlődéstanilag is sokkal primitivebb sajátosság, mint a fejlődéstanilag is magas fokon álló dolichopodia. Ez a rendkívül érdekes és nagyon lényeges lábszerkezeti különbség arra kényszerít, hogy a *D. hungaricum*-ot új nembe, a *Prodinotherium* nov. genusba soroljam be. Nem lehetetlen, hogy újabb leletek alapján idővel az összes kistestű dinotheriumokat ebbe az új nembe kell majd sorolni, de a megfelelő lábcsontok ismeretének hiánya következtében ettől a besorolástól el kellett tekintenem. A *Prodinotherium hungaricum* mindenesetre az eddig ismert legrégibb dinotheriumok egyike, melyek korát a legpontosabban ismerjük.

ON THE GEOLOGICAL OCCURRENCE OF *PRODINOTHERIUM HUNGARICUM* ÉHIK.

By T. SZALAI, Ph. D.
Member of the Collegium Hungaricum in Vienna.

On both find places of *Prodinotherium hungaricum* ÉHIK, namely at Kotyháza in the neighbourhood of Salgótarján, and at Királd not very far from the former locality, the bed layers of the coalmeasures are generally formed by a tough clay. Its material is sometimes of a swelling kind, sometimes of a sandy one, and its colour is bluish gray if wet, and greenish grey when dry. Embedded vegetal remains are to be found rather abundantly in this clay, among which *Calamus*[1] and *Cinnamomum*[2] are the most frequent, whilst the Vertebrate fauna is represented by *Mastodon angustidens* CUV.,[3] *Aceratherium tetradactylum* LART.,[4] *Prodinotherium hungaricum* ÉHIK,[5] *Testudo Fejérváryi* n. sp.[6] and some *Trionyx*[7] remains.

The deposits concerned consist in the following series of Aquitanian layers as known from Salgótarján:

Name of layer:		Average bulk
1. Bed layer with intercalated gravel and clay		50 m
2. Variegated clay		
3. Lower rhyolite-tuff		50 „
4. Bluish gray clay (so-called „plastic clay" or „bedding clay" containing the Vertebrate fauna)		30 „
5. Lower (so-called 3rd) coalmeasure		1—2 m
6. Cover slate (at its bottom gray and brown, so-called „kanavász")		15 m
7. Sandy layer		10 „
8. Middle (so-called 2nd) coalmeasure	with *Congeria*	0—6 m
9. Salty clay		20 m
10. Sand		10 „
11. Upper (so-called 1st) coalmeasure	with *Teredo*	0·5—2 m
12. Salty clay		10 m
13. *Cardium*-slate		20 „

The geological age of these layers covering the Upper Oligocene marine sediments (as glauconitic sandstone, and sand with *Axinea obovata* L.) is, no doubt, the Aquitanian. Upon these deposits follow the Miocene, especially the Burdigalian, beds, consisting of the so-called *Pecten praescabriusculus*-sands and the lower Schlier-formation, with an average bulk of 180 m.

Besides the Salgótarján basin, the Aquitanian series is known from the valleys of the Sajó and the Eger[8], and can be followed to the mountains of Szentendre and Visegrád.[9]

One of the most renowned find places of Aquitanian fossils in this region is Ipolytarnóc (Dep. Nógrád), the geology of which was described by J. Noszky.[10]

The lowest Aquitanian layer consists, there, of gravels, covered by a hard and dark brown sandstone bank, upon which follows the (so-called lower) rhyolite-tuff. On the upper limit of that sandstone H. de Bockh[11] found a great many of mammalian and bird footprints. From both the sandstone and the volcanic tuff a remarkably rich fossil flora (with fine specimens of silicified pine trees) is known, and was successively described by J. Jablonszky[12] and J. de Tuzson.[13]

In spite of the fact that at Ipolytarnóc the Aquitanian series shows a poorer file of deposits, and embraces essentially but the layers 1 to 3 known from Salgótarján, and although the fossils were found at Ipolytarnóc only in the lower rhyolite-tuffs, while at Salgótarján they are embedded in its covering clay-layer as well: both Aquitanian series should be considered as practically identical deposits. Moreover, the studies of J. Jablonszky[12] established the fact that the greatest number of fossil plants found in these layers points towards the circumstance of a swamp or marsh land having there existed, and that the whole flora shows rather subtropical features, though tropical elements co-occur with them.

The geological history of the Aquitanian series in Central Hungary — which is to be met with in the following mountains and mountain ranges: Bükk, Cserhát, Mátra, Szentendre and Visegrád, Mecsek, as well as in the hills near Esztergom — can be therefore traced as follows: The alternation of marine, brackish and terrestric sediments is characteristic of the whole Central European, and, indeed, of the Hungarian Upper Oligocene. Towards the end of that epoch the central mountain-ranges of Hungary got more or less rid of the salt waters, the lower Miocene representatives of which merely consist in rather temporary lakes. The limit between the Upper Oligocene and the Lower Miocene is to be recognized in those terrestric deposits which belong to the so-called Aquitanian. The stratigraphical delimitation — substantiated in the prevalence of terrestric deposits — of the Aquitanian is supported by the faunistical differences existing between the Aquitanian terrestric fauna on the one hand, and the Upper Oligocene and the Lower Miocene marine fauna on the other.

Up to the present day, the following Dinotherians are known from the Lower Miocene: *Dinotherium bavaricum* Meyer[14], *D. intermedium* Blainv.[15], *D. Hobleyi* And.[16] and *D. naricum* Pilgr.[17] Among these, *D. Hobleyi* lived in the Burdigalian, whilst the exact identification of the layers in which *D. naricum* occurs, still remains an open question, just as in the case of *D. bavaricum*. For opinions are diverging as to the geological age of *D. bavaricum*, the species being ascribed by Schlosser (in 1923)[18] to the Upper Miocene, whilst Abel (in 1922)[19] looks upon it as dating from the Middle Miocene, and Petraschek[20] (in 1922—24) refers to the specimens found on the very same spot, as originating from „Aquitanian" deposits. It should be mentioned that the Eibischwald-beds are considered by Winkler (1924)[21] to form, with the basal coalmeasure, the Schlier-facies of the Middle Miocene, whilst Hilber (1908)[22] believes that they are more ancient, without, however, precisionizing their age.

As to the oecological side of the problem it should be remarked that the habits of *Prodinotherium* obviously agreed with those of *Dinotherium*, the latter having been duly clarified by O. Abel [(**19**) p. 293—294)]. *Prodinotherium* may have lived in swampy or marshy regions, having but rarely crossed the steppes and savannahs. The biosphere represented by the Hungarian Aquitanian is similar to, or

practically identical with, that of the Vienna basin so well characterized by ABEL [(19) p. 244—247], and since Dr. LAMBRECHT[23] described the fossil bird-footprints from the Ipolytarnóc Aquitanian deposits, we know that the place was inhabited by a rather rich avifauna as well.

The *Prodinotherium* remains described by ÉHIK are especially important from the stratigraphical point of view: for they are the only Dinotherian fossils which undoubtedly belong to the transition beds connecting the Upper Oligocene with the Lower Miocene, precisely this set of strata representing the Aquitanian. The biohistorical importance of such statement lies, moreover, in the fact that no Dinotherian remains are known, up to now, from strata older than those belonging to the Aquitanian.

Finally it should be pointed out that the Salgótarján series affords full evidence of the stratigraphical series beginning with the Tongrian and ending with the Meotian,[24] and offers, therefore a clue to the startigraphy of all territories belonging to the same paleogeographical unit as the Hungarian locality just mentioned.

There are, of course, facial differences between the single Tertiary deposits occurring in Hungary: the so-called *Anomya*-sand beds, *e. g.*, were looked upon, until but some years ago, as belonging to the Lower Mediterranean, whilst my geological field work, done in the mountain range of Szentendre and Visegrád, proved that they date from the Upper Oligocene. Quite independently of the writer of the present lines, J. NOSZKY [(10) p. 203] came to the same conclusion when preparing the geological map of the adjacent Cserhát-region. Already previously to these investigations, A. KOCH[25] und H. DE BOCKH[26] were struck with the fact of *Anomya costata* EICHW. being present in the fauna of the *Axinea obovata*-sand, whilst, on the other hand, the latter species figures in the cover slate fauna of the *Anomya costata*-sand.

LITERATURE.

[1—4] Noszky: A Mátrahegység geomorphológiai viszonyai. (Debreceni Tisza I. Tud. Társ. Kiadv. — Publ. Pour La Commiss. De La Géogr. du Pays Natal, vol. III, 1926/27, p. 29.) Debrecen.

[5] Vide ante.

[6] MS.

[7] Id. MS.

[8] Noszky: Geol. u. entwicklungsgesch. Verh. d. Zagyvatales u. seiner Umgeb. (Centralbl. f. Min. Geol. etc. 1924.)

[9] Szalai: Kontinentales Sarmaticum v. Szentendre etc. (N. Jahrb. f. Min. Geol. etc. Beilbd. LX. B. 1928. p. 308.)

[10] Noszky: Oligoc.—mioc. Bildungen in NO-Teil d. ungar. Mittelgeb. (Ann. Mus. Nat. Hung. XXIV, 1926. p. 325.) Budapest.

[11] Böckh J.: Direktionsbericht. (Jahresber. d. Kgl. Ung. Geol. Anst. f. 1900.) Budapest.

[12] Jablonszky: Mediterr. Flora v. Tarnóc. (Mitt. a. d. Jahrb. d. Kgl. Ungar. Geol. Anst. XXII—4. 1915.) Budapest.

[13] Tuzson: Der fossile Baumstamm bei Tarnóc. (Természetrajzi Füz. XXIV.) Budapest.

[14] Meyer, H. v. Das Dinotherium Bavaricum, etc. (Nova acta Physico-Medica Academiae Caesareae Leopoldino-Carolinae Naturae Curiosorum. Vol 16. part 2. 1833.)

[15] Blainvielle: Osteographie IV. — Lortet: Observations sur les Tortues Terrestres etc. (Archives du Museum d'Histoire Naturelle de Lyon IV, 1887.)

[16] Andrews; On a New Species of Dinotherium from British East Afrika. (Proc. Zool. Soc. London 1911.)

[17] Guyet et Pilgrim: The tertiary and Post-Tertiary freshwater deposits of Baluchistan and Sing with notices of new vertebrates. (Records of the Geological Survey of India Vol. XXXVII.)

[18] Zittel—Schlosser—Broili: Grundz. d. Paläontologie. II. Berlin, 1923.

[19] Abel: Lebensbilder a. d. Tierwelt. Jena, 1922.

[20] Petraschek: Kohlengeologie. Wien. 1923/24.

[21] Winkler: Studienerg. i. Tertiärgeb. v. SW-Steiermark. (Verh. d. Geol. Bundesanst. 1924.) Wien.

[22] Hilber: Das Alter der steier. Braunkohlen. (Mitt. d. Geol. Ges. I. 1908.) Wien.

[23] Lambrecht: Foss. Vögel d. Borsoder Bükk-Geb. (Aquila, XIX, 1912.) Budapest.

[24] Noszky: Führer durch das oligo-miozäne Gebiet des Salgótarjáner Beckens, p. 4. (Führer zu den Studienreisen der Paläontologischen Gesellschaft bei Gelegenheit des Paläontologentages in Budapest, 1928.)

[25] Koch: Geol. Beschaff. d. a. recht. Ufer geleg. Hälfte d. Donautrachytgeb. nahe Budapest. (Zeitschr. d. D. Geol. Ges. XXVIII, 1876, p. 340 u. 341.) Berlin.

[26] Böckh H. de: Geol. Verh. d. Umgeb. v. Nagymaros. (Mitt. a. d. Jahrb. d. Kgl. Ung. Geol Anst. XIII, p. 9, 1899.) Budapest.

A Prodinotherium hungaricum ÉHIK lelőhelyének geológiai viszonyai.

Irta: SZALAI TIBOR dr.
a bécsi Collegium Hungaricum tagja.

A *Prodinotherium* maradványok a salgótarján-környéki és a királdi széntelepek feküjéből kerültek napvilágra. Ebből a képződményből több gerinces maradvány, valamint lábnyomok (Ipolytarnóc) és növények is ismeretesek. A fekü felső oligocén (glaukonitos homokkő, *Axinea obovata*-s homok) és a fedő burdigalien tengeri fauna közti éles különbség, épúgy mint az említett gerinces stb. maradványok megjelenése követeli, hogy azt a képződményt, amelyből a gerincesek stb. ismeretesek, az oligocén és miocén közti határnak tekintsük. Annál inkább, mert ez a főként terresztrikus képződmény generális elterjedésben ismeretes a Magyar Középhegység egyrészében (Bükk-, Cserhát-, Mátra-, Szentendre—Visegrádi hegységekben, Esztergom vidékén és a Mecsek-hegységben), tehát ezt az időszakot a Magyar Középhegységben nagy kiemelkedés jellemzi, amely kiemelkedés fejlődéstanilag is a legtermészetesebb határ. Ezt a határképződményt nevezzük aquitanien-nek.

Az a *Prodinotherium* lelet, amelyet ÉHIK írt le az előző sorokban, abból a szempontból is figyelmet érdemel, hogy eddigi ismereteink szerint ez az egyetlen *Dinotherium*-lelet, melyről biztosan tudjuk, hogy az oligo—miocén határról való. Ennek a ténynek jelentőségét fokozza ama körülmény is, hogy a miocénnél idősebb korból *Dinotherium*-ot nem ismerünk.

Végezetül még megemlítem, hogy a salgótarjáni rétegszelvény (NOSZKY) a Tongrien-től a Mäotien-ig a harmadkor sztratigrafiáját a lehető legpontosabban tárja elénk. Ezért a tercier sztratigrafia fenti részleteinek azokon a területeken, amelyek paleogeografiailag összefüggnek a magyar medencével, a magyar medencéhez kell igazodniok.

CONTENTS.

EXPLANATION OF PLATE.

Fig. 1. The mandible (about 1/4 nat. size).

Fig. 2. The right mandibular tooth-row (about 1/2 nat. size).

Fig. 3. The left mandibular tooth-row (about 1/2 nat. size).

Fig. 4, 5 and 7. The first lower right premolar (pm_4) found at Királd (about 2/3 nat. size), *4* = lingual side, *5* = buccal side, *7* and *7/a* = viewed from above.

Fig. 6. Right lower molar (m_2) found at Királd, with finely wrinkled enamel layer. (Greatly enlarged).

TÁBLAMAGYARAZAT.

1. ábra. Az alsó állkapocs (kb. 1/4 nagyságban).

2. ábra. A jobboldali alsó fogsor (kb. 1/2 nagyságban).

3. ábra. A baloldali alsó fogsor (kb. 1/2 nagyságban).

4., 5. és 7. ábra. Jobboldali alsó első előzápfog (pm_3) Királdról (kb. 2/3 nagyságban); *4* = a belső oldalról, *5* = a külső oldalról, *7* és *7/a* = felülről nézve.

6. ábra. Joboldali alsó zápfog (m_2) Királdról, finoman ráncolt zománcréteggel. (Erősen nagyítva).

PHOT. T. DÖMÖK. Lichtdruck v. Max Jaffé, Wien.

EXPLANATION OF PLATE.

Fig. 1. The left branch of the mandible in side-view (about 1/4 nat. size).

Fig. 2. The right branch of the mandible in side-view (about 1/4 nat. size).

Fig. 3. The proximal fragment of the ulna with the olecranon (about 1/3 nat. size).

TÁBLAMAGYARÁZAT.

1. ábra. Az alsó állkapocs baloldali ága oldalnézetben (kb. 1/4 nagyságban).

2. ábra. Az alsó állkapocs jobboldali ága oldalnézetben (kb. 1/4 nagyságban).

3. ábra. A singcsont (ulna) proximális töredéke a könyökcsonttal (kb. 1/3 nagyságban).

PHOT. T. DÖMÖK. Lichtdruck v. Max Jaffé, Wien.

EXPLANATION OF PLATE.

Fig. 1. The scapula (about $^1/_3$ nat. size).

Fig. 2. The proximal portion of the humerus (about $^1/_3$ nat. size).

Fig. 3. The shaft of the humerus (about $^1/_3$ nat. size).

Fig. 4. The distal part of the humerus (about $^1/_3$ nat. size).

Fig. 5. The proximal end of the radius (about $^1/_3$ nat. size).

Fig. 6. The distal end of the radius (about $^2/_3$ nat. size).

Fig. 7. The first thoracic vertebra (about $^1/_3$ nat. size).

TÁBLAMAGYARÁZAT.

1. ábra. A lapockacsont (kb. $^1/_3$ nagyságban).

2. ábra. A felkarcsont proximális töredéke (kb. $^1/_3$ nagyságban).

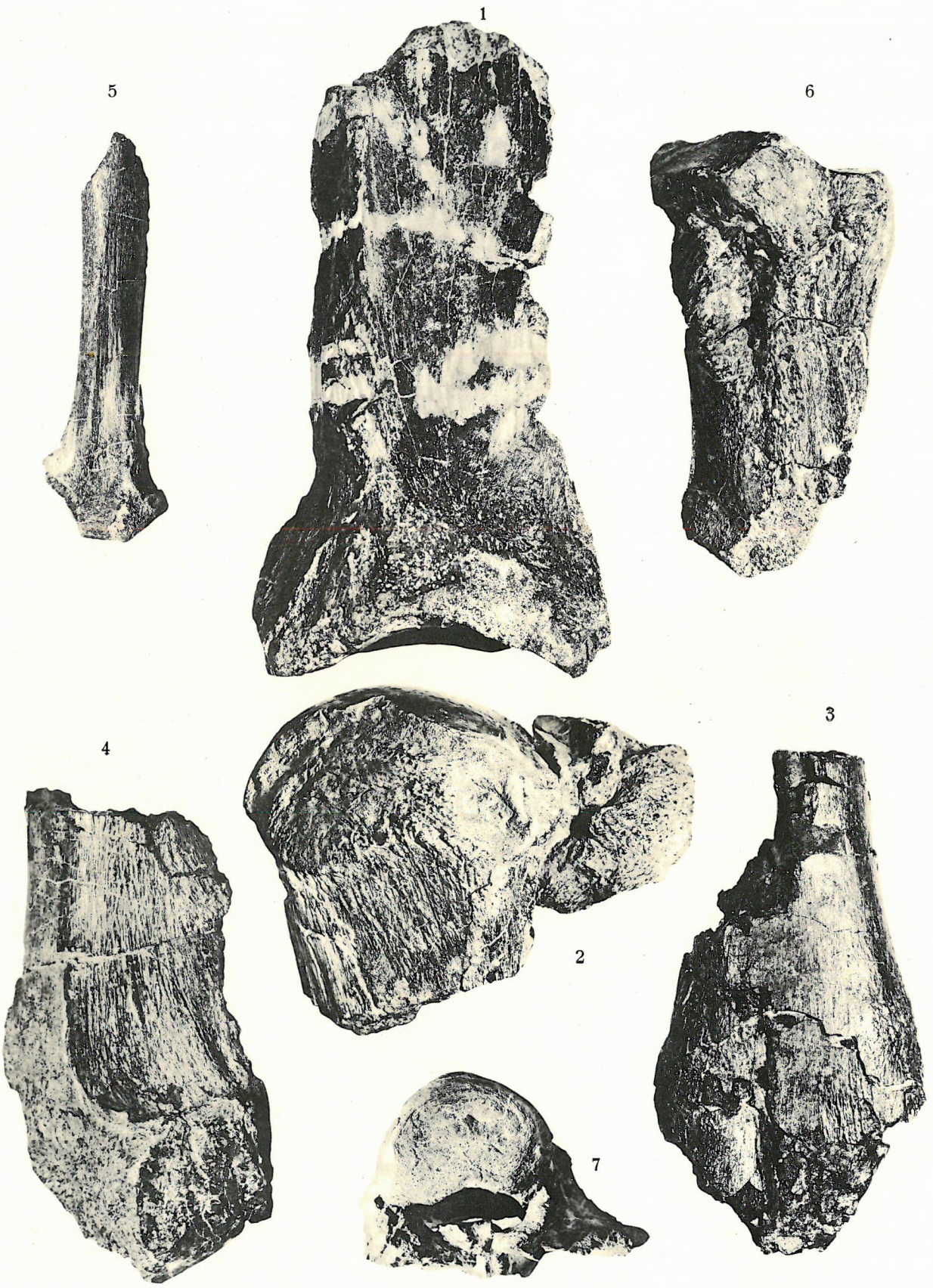
3. ábra. A felkarcsont középső része (kb. $^1/_3$ nagyságban).

4. ábra. A felkarcsont disztális része (kb. $^1/_3$ nagyságban).

5. ábra. Az orsócsont proximalis vége (kb. $^1/_3$ nagyságban).

6. ábra. Az orsócsont disztális vége (kb. $^2/_3$ nagyságban).

7. ábra. Az első hátcsigolya (kb. $^1/_3$ nagyságban).



PHOT. T. DÖMÖK. Lichtdruck v. Max Jaffé Wien.

EXPLANATION OF PLATE.

Fig. 1. The bones of the carpus (about $^2/_3$ nat. size). In the upper row from left to right: Scaphoideum (?), lunatum, triquetrum. In the lower row from left to right: Trapezoideum, magnum, unciforme.

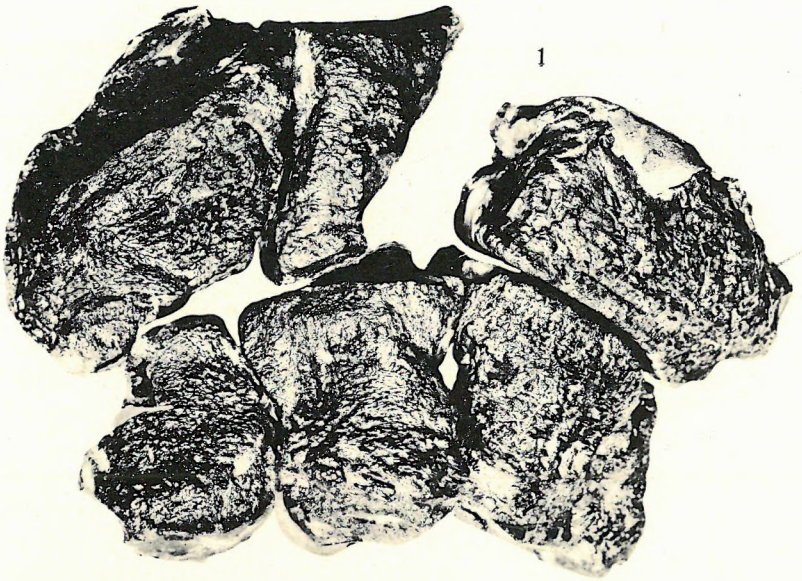
Fig. 2. The fourth metacarpal bone (nat. size). Viewed from the frontal (*a*), lateral (*b*), and from the posterior side (*c*).

TÁBLAMAGYARÁZAT.

1. ábra. A kéztőcsontok (kb. $^2/_3$ nagyságban). A felső sorban balról jobbra: Scaphoideum (?), lunatum, triquetrum. Az alsó sorban balról jobbra: Trapezoideum, magnum, unciforme.

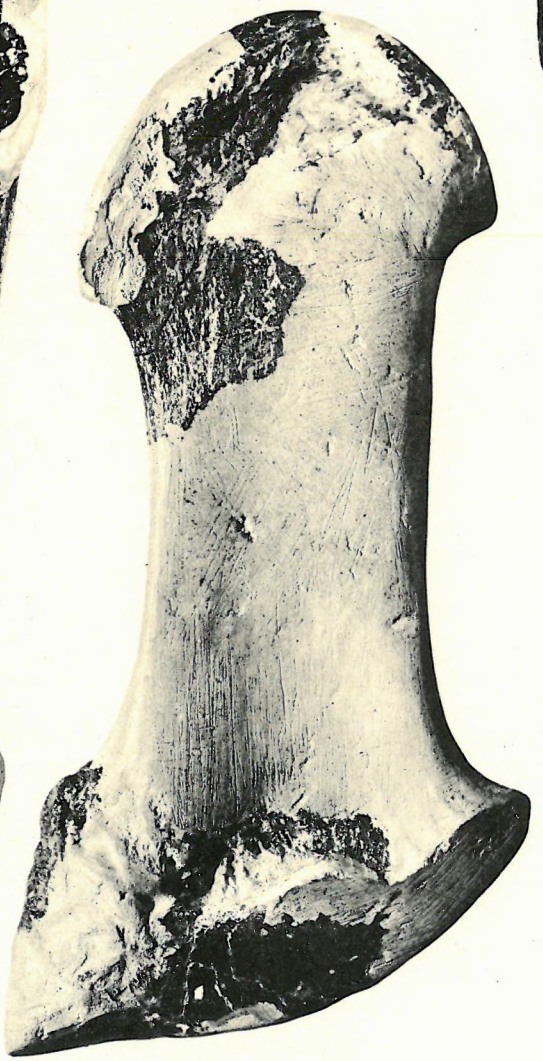
2. ábra. A negyedik kézközépcsont (term. nagys.) *a* = elülről, *b* = oldalról, *c* = hátulról nézve.

1



2 a

2 b



2 c

PHOT. T. DÖMÖK.

Lichtdruck v. Max Jaffé, Wien.